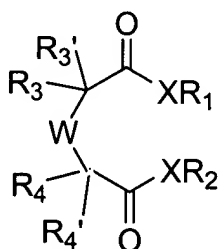


### AMENDMENTS TO THE CLAIMS

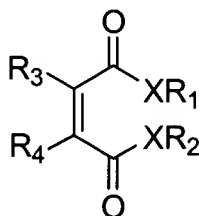
1. **(Currently amended)** A method for vaccinating a mammal against an antigen, comprising:

introducing into the mammal an effective dose of the antigen or an epitope(s) thereof; and

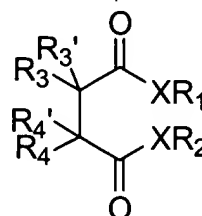
administering to the mammal a topical treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells in a lymphoid organ, wherein introducing the antigen and administering the treatment are performed independently in any order, wherein the antigen or epitope(s) thereof is introduced into the mammal by disrupting the stratum corneum, wherein the topical treatment comprises a lipophilic molecule capable of traversing the stratum corneum and inducing dendritic cells to migrate to the draining lymphoid organ, and wherein said lipophilic molecule is  $\leq 500$  daltons and ~~does not induce contact dermatitis~~ is selected from the following formulas:



(1)



(2)



(3)

wherein  $R_1$  and  $R_2$  are independently alkyl side chains containing 1 to 16 carbon atoms,  $C_1$  to  $C_{16}$  substituted alkyl,  $C_3$  to  $C_{10}$  cycloalkyl,  $C_3$  to  $C_{10}$  substituted cycloalkyl,  $C_2$  to  $C_{10}$  alkenyl,  $C_2$  to  $C_{10}$  substituted alkenyl,  $C_2$  to  $C_{10}$  alkynyl,  $C_2$  to  $C_{10}$  substituted alkynyl;

wherein  $R_3$ ,  $R_3'$ ,  $R_4$  and  $R_4'$  are selected independently from the group consisting of hydrogen atom, hydroxy group, halogeno group, alkyl side chains containing 1 to 16 carbon atoms,  $C_1$  to  $C_{16}$  substituted alkyl,  $C_3$  to  $C_{10}$  cycloalkyl,  $C_3$  to  $C_{10}$  substituted cycloalkyl,  $C_2$  to  $C_{10}$  alkenyl,  $C_2$  to  $C_{10}$  substituted alkenyl,  $C_2$  to  $C_{10}$  alkynyl,  $C_2$  to  $C_{10}$  substituted alkynyl,  $C_7$  to  $C_{16}$  phenylalkyl,  $C_7$  to  $C_{16}$  substituted phenylalkyl, phenyl, substituted phenyl, naphthyl and substituted naphthyl;

wherein X is an oxygen or a nitrogen atom; and

wherein W is a saturated or unsaturated chain consisting of C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>1</sub>-C<sub>10</sub> substituted alkyl, C<sub>7</sub>-C<sub>10</sub> phenylalkyl, C<sub>7</sub>-C<sub>16</sub> substituted phenylalkyl, phenyl, substituted phenyl, naphthyl, substituted naphthyl, C<sub>3</sub>-C<sub>7</sub> cycloalkyl and C<sub>3</sub>-C<sub>7</sub> substituted cycloalkyl group, and wherein each terminus of the chain is bonded to the carbon C(R<sub>3</sub>R<sub>3</sub>') and C(R<sub>4</sub>R<sub>4</sub>').

2. (Canceled)
3. (Canceled)
4. (Withdrawn) The method of Claim 3, wherein W contains one or more heteroatoms selected from the group consisting of nitrogen, sulfur, and oxygen in combination or independently.
5. (Withdrawn) The method of Claim 3, wherein the R<sub>1</sub> and R<sub>2</sub> groups are identical C<sub>1</sub> to C<sub>6</sub> alkyl moieties.
6. (Currently amended) The method of Claim 3 1, wherein R<sub>1</sub> and R<sub>2</sub> are (CH<sub>2</sub>)<sub>3</sub>-CH<sub>3</sub>.
7. (Withdrawn) The method of Claim 3, wherein X is an oxygen and R<sub>3</sub> and R<sub>4</sub> are linked to form a ring structure which, including the W chain, comprises a saturated or unsaturated C<sub>3</sub> to C<sub>10</sub> cycloalkyl, C<sub>3</sub> to C<sub>10</sub> substituted cycloalkyl, C<sub>7</sub> to C<sub>16</sub> phenylalkyl, C<sub>7</sub> to C<sub>16</sub> substituted phenylalkyl, phenyl, substituted phenyl, naphthyl or substituted naphthyl.
8. (Currently amended) The method of Claim 3 1, wherein X is an oxygen and R<sub>3</sub> and R<sub>4</sub> are linked to form a ring structure which, including the W chain, comprises a saturated or unsaturated C<sub>3</sub> to C<sub>10</sub> cycloalkyl, C<sub>3</sub> to C<sub>10</sub> substituted cycloalkyl, C<sub>7</sub> to C<sub>16</sub> phenylalkyl, C<sub>7</sub> to C<sub>16</sub> substituted phenylalkyl, phenyl, substituted phenyl, naphthyl or substituted naphthyl, and wherein the ring structure is an aryl group.
9. (Withdrawn) The method of Claim 7, wherein the ring structure contains one or more heteroatoms selected from the group consisting of nitrogen, sulfur, and oxygen.
10. (Withdrawn) The method of Claim 3, wherein the lipophilic molecule comprises a terpene.
11. (Currently amended) The method of Claim 1, wherein the lipophilic molecule is selected from the group consisting of dibutyl phthalate, dibutyl-D-tartrate, N,N-diethyl-toluamide, dibutylfumarate, di(2-ethylhexyl)fumarate, diisooctylmaleate, diethylhexylmaleate, diisooctylfumarate, benzoic acid, bihenylmaleate, dioctylphthalate, dibutylmaleate,

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dioctymaleate, dibutylsuccinate, dioctylsuccinate, dinonylphthalate, diisononylphthalate, dimethylphthalate, diethylphthalate, dipropylphthalate, diphenylphthalate, dibenzylbutylphthalate, and diethylmethylphthalate ~~and campher~~.

12. **(Canceled)**

13. **(Previously presented)** The method of Claim 1, wherein the lipophilic molecule has an oil/water partition coefficient  $>1$ .

14. **(Previously presented)** The method of Claim 13, wherein the lipophilic molecule has an oil/water partition coefficient of between about 10 and about  $10^6$ .

15. **(Previously presented)** The method of Claim 1, wherein the topical treatment further comprises an organic solvent.

16. **(Original)** The method of Claim 15, wherein the organic solvent is acetone.

17. **(Previously presented)** A method for vaccinating a mammal against an antigen, comprising:

introducing into the mammal an effective dose of the antigen or an epitope(s) thereof; and

administering to the mammal a topical treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells in a lymphoid organ, wherein introducing the antigen and administering the treatment are performed independently in any order, and wherein the topical treatment comprises application of ultrasound energy.

18. **(Original)** The method of Claim 1, wherein the antigen or epitope(s) thereof is introduced into the mammal by a virus, a bacterium, a fungus, or a parasite.

19. **(Previously presented)** A method for vaccinating a mammal against an antigen, comprising:

introducing into the mammal an effective dose of the antigen or an epitope(s) thereof; and

administering to the mammal a topical treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells in a lymphoid organ, wherein introducing the antigen and administering the treatment are performed independently in any order, and wherein the antigen or epitope(s) thereof is introduced into the mammal by ingestion.

20. **(Canceled)**

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21. **(Original)** The method of Claim 1, wherein the antigen or epitope(s) thereof is introduced into the mammal by injection.

22. **(Original)** The method of Claim 21, wherein the injection is made via a route selected from the group consisting of intraepidermal, intradermal, subcutaneous, intramuscular, intravascular, or into a specific organ.

23. **(Previously presented)** The method of Claim 1, wherein the antigen or epitope(s) thereof is introduced into the mammal via delivery to respiratory, urogenital or gastrointestinal tracts.

24. **(Currently amended)** A method for vaccinating a mammal against an antigen, comprising:

introducing into the mammal an effective dose of the antigen or an epitope(s) thereof; and

administering to the mammal a topical treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells in a lymphoid organ,

wherein introducing the antigen and administering the treatment are performed independently in any order, wherein said topical treatment comprises a lipophilic molecule capable of traversing the stratum corneum and inducing dendritic cells to migrate to the draining lymphoid organ, and wherein the antigen or epitope(s) thereof is introduced into the mammal by a transfer of cells containing the antigen or epitope(s) thereof.

25. **(Canceled)**

26. **(Canceled)**

27. **(Original)** The method of Claim 1, wherein the antigen or epitope(s) thereof is endogenous to the mammal and is either normal or pathologic.

28. **(Original)** The method of Claim 1, wherein the amount of topical treatment is sufficient to increase in the number of ~~antigen-bearing~~ dendritic cells in the lymphoid organ by a factor of about 2 to about 1000 times the number of resident dendritic cells in an untreated mammal.

29. **(Original)** The method of Claim 28, wherein the number of ~~antigen-bearing~~ dendritic cells in the lymphoid organ is increased by a factor of about 5 to about 100 times the number of resident dendritic cells in an untreated mammal.

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30. **(Original)** The method of Claim 1, wherein the amount of topical treatment is further characterized as being sufficient to increase local release of an endogenous inducer of dendritic cell migration and maturation.

31. **(Original)** The method of Claim 1, wherein the amount of topical treatment is further characterized as being sufficient to alter the plasma membrane expression or function of an adhesion molecule.

32. **(Canceled)**

33. **(Canceled)**

34. **(Canceled)**

35. **(Canceled)**

36. **(Canceled)**

37. **(Withdrawn)** The method of Claim 36, wherein W contains one or more heteroatoms selected from the group consisting of nitrogen, sulfur, and oxygen in combination or independently.

38. **(Canceled)**

39. **(Canceled)**

40. **(Canceled)**

41. **(Canceled)**

42. **(Withdrawn)** The method of Claim 36, wherein the ring structure contains one or more heteroatoms selected from the group consisting of nitrogen, sulfur, and oxygen.

43. **(Canceled)**

44. **(Canceled)**

45. **(Canceled)**

46. **(Canceled)**

47. **(Canceled)**

48. **(Canceled)**

49. **(Canceled)**

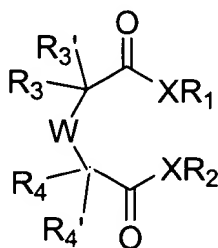
50. **(Canceled)**

51. **(Original)** A method for vaccinating a mammal against an antigen, comprising:  
injecting into the mammal an effective dose of the antigen or an epitope(s)  
thereof; and

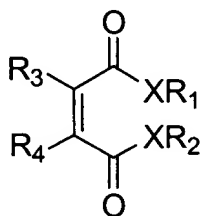
administering to the mammal a topical treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells in a draining lymphoid organ,

wherein the topical treatment comprises a lipophilic molecule with a molecular weight of  $\leq 500$  daltons.

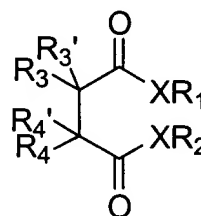
52. **(Currently amended)** A method for enhancing an immune response in a mammal against an endogenous antigen, comprising repeated topical application to the mammal of a lipophilic compound having a molecular weight  $\leq 500$  daltons, wherein the lipophilic compound is applied in an amount sufficient to increase the number of antigen-bearing dendritic cells in a lymphoid organ and wherein said lipophilic compound is selected from the following formulas:



(1)



(2)



(3)

wherein  $R_1$  and  $R_2$  are independently alkyl side chains containing 1 to 16 carbon atoms,  $C_1$  to  $C_{16}$  substituted alkyl,  $C_3$  to  $C_{10}$  cycloalkyl,  $C_3$  to  $C_{10}$  substituted cycloalkyl,  $C_2$  to  $C_{10}$  alkenyl,  $C_2$  to  $C_{10}$  substituted alkenyl,  $C_2$  to  $C_{10}$  alkynyl,  $C_2$  to  $C_{10}$  substituted alkynyl;

wherein  $R_3$ ,  $R_3'$ ,  $R_4$  and  $R_4'$  are selected independently from the group consisting of hydrogen atom, hydroxy group, halogeno group, alkyl side chains containing 1 to 16 carbon atoms,  $C_1$  to  $C_{16}$  substituted alkyl,  $C_3$  to  $C_{10}$  cycloalkyl,  $C_3$  to  $C_{10}$  substituted cycloalkyl,  $C_2$  to  $C_{10}$  alkenyl,  $C_2$  to  $C_{10}$  substituted alkenyl,  $C_2$  to  $C_{10}$  alkynyl,  $C_2$  to  $C_{10}$  substituted alkynyl,  $C_7$  to  $C_{16}$  phenylalkyl,  $C_7$  to  $C_{16}$  substituted phenylalkyl, phenyl, substituted phenyl, naphthyl and substituted naphthyl;

wherein X is an oxygen or a nitrogen atom; and

wherein W is a saturated or unsaturated chain consisting of  $C_1$ - $C_{10}$  alkyl,  $C_1$ - $C_{10}$  substituted alkyl,  $C_7$ - $C_{10}$  phenylalkyl,  $C_7$ - $C_{16}$  substituted phenylalkyl, phenyl, substituted phenyl, naphthyl, substituted naphthyl,  $C_3$ - $C_7$  cycloalkyl and  $C_3$ - $C_7$  substituted cycloalkyl

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group, and wherein each terminus of the chain is bonded to the carbon C(R<sub>3</sub>R<sub>3</sub>') and C(R<sub>4</sub>R<sub>4</sub>').

53. **(Original)** The method of Claim 52, wherein said endogenous antigen is a tumor antigen.

54. **(Canceled)**

55. **(Currently amended)** A method for vaccinating a mammal against an antigen, comprising:

providing the mammal with an effective dose of the antigen or an epitope(s) thereof; and

administering internally to the mammal a treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells in a lymphoid organ, wherein the treatment comprises a lipophilic molecule with a molecular weight of  $\leq 500$  daltons.

56. **(Original)** The method of Claim 55, wherein administering the treatment internally occurs via a route selected from the group consisting of injection, delivery into an organ, and delivery to the gastrointestinal, respiratory or urogenital tracts.

57. **(Canceled)**

58. **(New)** A method for vaccinating a mammal against an antigen, comprising:

injecting into the mammal an effective dose of the antigen or an epitope(s) thereof; and

administering to the mammal a topical treatment in an amount sufficient to increase the number of antigen-bearing dendritic cells in a draining lymphoid organ, wherein the topical treatment comprises a lipophilic molecule.

59. **(New)** A method for vaccinating a mammal against an antigen, comprising:

administering to the mammal an effective dose of the antigen or an epitope(s) thereof; and

administering to the mammal a topical treatment comprising camphor in an amount sufficient to increase the number of antigen-bearing dendritic cells in a draining lymphoid organ.